

CLAIMS:

1. A universal hollow modular building block for construction of buildings and structural elements comprising:

- a block body formed from an outer wall, an inner wall, and at least a first connection element and a second connection element which interconnect said outer wall and said inner wall and form a first through opening in a vertical direction, said block body having longitudinal direction, said block body having an upper side and lower side;

- a first upper recess extending in said longitudinal direction and formed on said upper side of said block body in at least in one of said connection elements;

- a first lower recess extending in said longitudinal direction and formed on the lower side of said block body in at least in one of said connection elements;

- an upper insert made of a heat-insulating material, inserted into said first through opening from the upper side of said block body, and supported by said upper recess;

- a lower insert made of a heat-insulating material, inserted into said first through opening from the lower side of said block body, and at least partially supporting said block body via contact with said lower recess;

- a second through opening formed in a vertical direction in said upper insert;

- a third through opening formed in a vertical direction in said lower insert, so that when said upper insert and said lower insert are inserted into said first through opening and a plurality of said universal hollow modular building blocks are assembled into a structural element such as a wall, said upper recess, said lower recess, said second through opening, and said third through opening of each of said blocks form a continuous

lattice-like space suitable for pouring a moldable and curable material which after curing forms a lattice-like load-carrying framework;

said block body being divided along said longitudinal direction and in the middle of said connection elements by auxiliary inserts made of a material with high heat-insulating properties.

2. The building block of Claim 1, wherein said material of high-insulating properties is selected from the group consisting of phenol formaldehyde plastic, high-density polyethylene, and polyvinylchloride.

3. A universal hollow modular building block for construction of buildings and structural elements comprising:

a block body formed from an outer wall, an inner wall, and at least a first connection element and a second connection element which interconnect said outer wall and said inner wall and form a first through opening in a vertical direction, said block body having longitudinal direction, said block body having an upper side and lower side;

a first upper recess extending in said longitudinal direction and formed on said upper side of said block body in at least in one of said connection elements;

a first lower recess extending in said longitudinal direction and formed on the lower side of said block body in at least in one of said connection elements;

an upper insert made of a heat-insulating material, inserted into said first through opening from the upper side of said block body, and supported by said upper recess;

a lower insert made of a heat-insulating material, inserted into said first through opening from the lower side of said block body, and at least partially supporting said block body via contact with said lower recess;

a second through opening formed in a vertical direction in said upper insert;

a third through opening formed in a vertical direction in said lower insert, so that when said upper insert and said lower insert are inserted into said first through opening and a plurality of said universal hollow modular building blocks are assembled into a structural element such as a wall, said upper recess, said lower recess, said second through opening, and said third through opening of each of said blocks form a continuous lattice-like space suitable for pouring a moldable and curable material which after curing forms a lattice-like load-carrying framework; and

a third connection element which is located between said first connection element and said second connection element and is arranged parallel thereto, said third connection element dividing said block body into a first cell and a second cell with a through vertical opening in each said cell.

4. The building block of Claim 3, wherein said material of high-insulating properties is selected from the group consisting of phenol formaldehyde plastic, high-density polyethylene, and polyvinylchloride.

5. A universal hollow modular building block for construction of buildings and structural elements comprising:

a block body formed from an outer wall, an inner wall, and at least a first connection element and a second connection element which interconnect said outer wall and said inner wall and form a first through opening in a vertical direction, said block body having longitudinal direction, said block body having an upper side and lower side;

a first upper recess extending in said longitudinal direction and formed on said upper side of said block body in at least in one of said connection elements;

a first lower recess extending in said longitudinal direction and formed on the lower side of said block body in at least in one of said connection elements;

an upper insert made of a heat-insulating material, inserted into said first through opening from the upper side of said block body, and supported by said upper recess;

a lower insert made of a heat-insulating material, inserted into said first through opening from the lower side of said block body, and at least partially supporting said block body via contact with said lower recess;

a second through opening formed in a vertical direction in said upper insert;

a third through opening formed in a vertical direction in said lower insert, so that when said upper insert and said lower insert are inserted into said first through opening and a plurality of said universal hollow modular building blocks are assembled into a structural element such as a wall, said upper recess, said lower recess, said second through opening, and said third through opening of each of said blocks form a continuous lattice-like space suitable for pouring a moldable and curable material which after curing forms a lattice-like load-carrying framework;

wherein said heat-insulating material of said upper insert and of said lower insert is selected from the group consisting of foam plastic, polyethylene, extruded polystyrene, compressed chip wood board, and glass wool.

6. The building block of Claim 5, wherein said first cell is oriented in said longitudinal direction, and said second cell is oriented in a direction perpendicular to said longitudinal direction, said first upper recess and said second upper recess being formed in said first cell, said block being further provided with a second upper recess and a second lower recess,

which are oriented in said direction perpendicular to said longitudinal direction.

7. The building block of Claim 6, wherein said first upper recess and said second upper recess are open from the side of said first connection element and are closed from the side of said second connection element, whereas said second upper recess and said second lower recess are open from the side of said outer wall and are closed from the side of said inner wall.

8. The building block of Claim 6, wherein said first upper recess and said second upper recess are open from the side of said first connection element and are closed from the side of said second connection element, whereas said second upper recess and said second lower recess are open from the side of said inner wall and are closed from the side of said outer wall.

9. The building block of Claim 7, wherein said upper insert is open from the side of said first connection element of said building block and is closed from the side of said second connection element of said building block, whereas said lower insert is a mirror image of said upper insert.

10. The building block of Claim 8, wherein said upper insert is open from the side of said first connection element of said building block and is closed from the side of said second connection element of said building block, whereas said lower insert is a mirror image of said upper insert.

11. A universal hollow modular building block for construction of buildings and structural elements comprising:

a block body formed from an outer wall, an inner wall, and at least a first connection element and a second connection element which interconnect said outer wall and said inner wall and form a first through opening in a vertical direction, said block body having longitudinal direction, said block body having an upper side and lower side;

a first upper recess extending in said longitudinal direction and formed on said upper side of said block body in at least in one of said connection elements;

a first lower recess extending in said longitudinal direction and formed on the lower side of said block body in at least in one of said connection elements;

an upper insert made of a heat-insulating material, inserted into said first through opening from the upper side of said block body, and supported by said upper recess;

a lower insert made of a heat-insulating material, inserted into said first through opening from the lower side of said block body, and at least partially supporting said block body via contact with said lower recess;

a second through opening formed in a vertical direction in said upper insert;

a third through opening formed in a vertical direction in said lower insert, so that when said upper insert and said lower insert are inserted into said first through opening and a plurality of said universal hollow modular building blocks are assembled into a structural element such as a wall, said upper recess, said lower recess, said second through opening, and said third through opening of each of said blocks form a continuous lattice-like space suitable for pouring a moldable and curable material which after curing forms a lattice-like load-carrying framework;

said upper recess and said lower recess being through recesses which pass from said first connection element to said second connection element.

12. A universal hollow modular building block for construction of buildings and structural elements comprising:

- a block body formed from an outer wall, an inner wall, and at least a first connection element and a second connection element which interconnect said outer wall and said inner wall and form a first through opening in a vertical direction, said block body having longitudinal direction, said block body having an upper side and lower side;

- a first upper recess extending in said longitudinal direction and formed on said upper side of said block body in at least in one of said connection elements;

- a first lower recess extending in said longitudinal direction and formed on the lower side of said block body in at least in one of said connection elements;

- an upper insert made of a heat-insulating material, inserted into said first through opening from the upper side of said block body, and supported by said upper recess;

- a lower insert made of a heat-insulating material, inserted into said first through opening from the lower side of said block body, and at least partially supporting said block body via contact with said lower recess;

- a second through opening formed in a vertical direction in said upper insert;

- a third through opening formed in a vertical direction in said lower insert, so that when said upper insert and said lower insert are inserted into said first through opening and a plurality of said universal hollow modular building blocks are assembled into a structural element such as a wall, said upper recess, said lower recess, said second through opening, and said third through opening of each of said blocks form a continuous lattice-like space suitable for pouring a moldable and curable material which after curing forms a lattice-like load-carrying framework; and

a second upper recess and a second lower recess oriented in a direction perpendicular to said longitudinal direction, open from the side of said inner wall, and closed from the side of said outer wall.

13. The building block of Claim 3, wherein said outer wall and said inner wall are rounded over a radius, and wherein said first connection element, said second connection element, and said third connection element are oriented along said radius.

14. The building block of Claim 4, wherein said block body is made from a material selected from the group consisting of cement, fiber-reinforced cement, wood, stone, ceramic, metal, gypsum, and plastic and said heat-insulating material of said upper insert and of said lower insert is selected from the group consisting of foam plastic, polyethylene, extruded polystyrene, compressed wooden chip material, and glass wool.

15. The building block of Claim 1, wherein said block body is made from a material selected from the group consisting of cement, fiber-reinforced cement, wood, stone, ceramic, metal, gypsum, and plastic and said heat-insulating material of said upper insert and of said lower insert is selected from the group consisting of foam plastic, polyethylene, extruded polystyrene, compressed wooden chip material, and glass wool.

16. The building block of Claim 3, wherein said block body is made from a material selected from the group consisting of cement, fiber-reinforced cement, wood, stone, ceramic, metal, gypsum, and plastic and said heat-insulating material of said upper insert and of said lower insert is selected from the group consisting of foam plastic, polyethylene, extruded polystyrene, compressed wooden chip material, and glass wool.

17. A universal hollow modular building block for construction of buildings and structural elements comprising:

- a block body formed from an outer wall, an inner wall, and at least a first connection element and a second connection element which interconnect said outer wall and said inner wall and form a first through opening in a vertical direction, said block body having longitudinal direction, said block body having an upper side and lower side;

- a first upper recess extending in said longitudinal direction and formed on said upper side of said block body in at least in one of said connection elements;

- a first lower recess extending in said longitudinal direction and formed on the lower side of said block body in at least in one of said connection elements;

- an upper insert made of a heat-insulating material, inserted into said first through opening from the upper side of said block body, and supported by said upper recess;

- a lower insert made of a heat-insulating material, inserted into said first through opening from the lower side of said block body, and at least partially supporting said block body via contact with said lower recess;

- a second through opening formed in a vertical direction in said upper insert;

- a third through opening formed in a vertical direction in said lower insert, so that when said upper insert and said lower insert are inserted into said first through opening and a plurality of said universal hollow modular building blocks are assembled into a structural element such as a wall, said upper recess, said lower recess, said second through opening, and said third through opening of each of said blocks form a continuous lattice-like space suitable for pouring a moldable and curable material which after curing forms a lattice-like load-carrying framework;

said block body being divided along said longitudinal direction and in the middle of said connection elements by auxiliary inserts made of a material with high heat-insulating properties; and

a screen made of a metal sheet in contact with one of said outer wall and inner wall for radiating heat back in the direction from where this heat has arrived.

18. A method of building a structural element such as a wall or a part of a building comprising:

providing a plurality of hollow modular building blocks, each block of said plurality comprising a block body with an upper recess and a lower recess, an upper insert and a lower insert made of a deformable material and inserted into said block body, said upper insert and said lower insert having vertical holes and recesses perpendicular to said vertical holes which intersect said vertical holes;

assembling said plurality of hollow modular building blocks into an element of a structure such as a part of a wall, thus forming a continuous multiple-cell space formed by said vertical holes and recesses perpendicular to said vertical holes;

pouring a liquid cementation material into said continuous space by using said upper insert and said lower insert as a formwork; and setting said cementation material to form a continuous multiple-cell load-carrying framework of said structural element.

19. The method of Claim 18, wherein said structural element is assembled at least

from two rows of said blocks, whereby said multiple-cell structure is turned into a lattice-like structure.

20. The method of Claim 18, comprising the step of inserting block-holding

reinforcement bars at least into said vertical holes prior to said step of pouring.

21. The method of Claim 18, further comprising a step of separating said block body into two parts thermally isolated from each other by a piece of a material with high heat/cold insulating properties.

22. A structural element such as a wall or a part of a building comprising:
a plurality of hollow modular building blocks assembled into said structural element, each block of said plurality comprising a block body with an upper recess and a lower recess, an upper insert and a lower insert made of a deformable material and inserted into said block body, said upper insert and said lower insert having vertical holes and recesses perpendicular to said vertical holes which intersect said vertical holes, said vertical holes and recesses perpendicular to said vertical holes forming a continuous multiple-cell space;
a continuous multiple-cell load-carrying framework of said structural element formed by pouring a liquid cementation material into said continuous space and then curing liquid cementation material.

23. The structural element of Claim 22, wherein said structural element is assembled
at least from two rows of said blocks, whereby said multiple-cell structure is turned into a lattice-like structure.

24. The structural element of Claim 23, further comprising block-holding reinforcement bars inserted at least into said vertical holes.

25. The structural element of Claim 22, wherein said block body is separated into two parts by a piece of material with high heat/cold insulating properties.

26. The structural element of Claim 22, wherein each said block body has an outer wall and an inner wall which in assembled state of said structural element form the final outer wall and the inner wall of said structural element, while said upper insert and said lower insert constitute a formwork for molding said continuous multiple-cell load-carrying framework which remain in said structural element as a heat/cold insulating element and as means for damping lateral forces applied to said inner wall and said outer wall of the block body during setting of said cementation material.